

Land Use Planning for Peri-Urban Area

J. Bhatariya Hinal

Student, Dept. of Town and Country Planning, Sarvajanic College of Engineering and Technology, Surat, India

Abstract: Peri urban agricultural production remains important globally and its value will increase as the impacts of climate change, energy costs, rising world population and changing patterns of food consumption are felt. Maintaining the natural resource base for food production around cities will become an increasingly important part of city planning. Yet peri-urban areas continue to undergo radical change over much of the world, displacing traditional agriculture and reducing the capacity of cities to adapt to non-linear change. Urban resilience is best maintained through a regional approach which connects urban and peri-urban systems. Such system relationships are examined in a case study focused on the city of Melbourne in South-East Australia. Peri-urban Melbourne produces a significant proportion of the fruit and vegetables grown in the state of Victoria, but agricultural production on the city's outer fringe is under pressure from rapid urban development. This case study examines three scenarios which relate rural and urban land supply and demand, and explore land use planning techniques for limiting rural land development and transferring demand for rural land to regional settlements. It argues that stronger statutory planning measures are required to stem the loss of peri-urban agricultural land and that these will need to be accompanied in future by a range of other strategies to strengthen the resilience of city food systems.

Keywords: Land Use Planning

1. Introduction

One of the enduring legacies of a 'pioneer' nation, such as Australia, is the belief that land will always be available for a range of uses and that technology will continue to increase production. This belief encourages the consumption of large areas of peri-urban agricultural land for urban purposes. Land use planning systems are intricately related to this process, either protecting or facilitating the conversion of agricultural land. The development of complex global food chains reduced the reliance of cities on peri-urban areas for their food supply. However, attention is once again turning to peri-urban areas in the context of growing pressures on the global food system, including climate change, loss of agricultural land, water scarcity and rapid urbanisation (Morgan and Sonnino 2010; RTPI 2014; Caldwell et al. 2011; FAO 2011). Climate change is likely to have a negative impact on global food production, due to increasing temperatures, a decrease in water availability and an increase in extreme weather events, such as drought and flooding. Its effects are expected to include rising food prices and increasing food insecurity, particularly for vulnerable and low income population groups (Porter et al. 2014). Water

availability for food production is also under pressure globally from over-allocation of water resources in most major river systems (Molden 2007) and there are growing constraints on the availability of land for food production (Bot et al. 2000).

2. Production and Consumption

Peri-urban areas have been "the locus of both consumption and production activities, of both resource-seeking and growth resisting policies, and of contrasting settlement forms" (Bourne et al. 2003:257). Changes in peri-urban areas are often regarded as a progressive shift away from the traditional production based land uses associated with agriculture to places of resource consumption (Sinclair et al. 2003,

Hollier et al. 2004; Barr 2003; Argent 2002, Pezzini and Wojan 2001, Pires 2004). Allen and Davila (2002) argue that such a shift involves a change from dominant forms of agriculture to a new multi-functional land use pattern in a mosaic of rural and urban uses where urban uses gradually become dominant. This new pattern is characterized by competing and increasing demands that affect the traditional cultural fabric of such areas. Aesthetic, recreational and biological resource values of this multi-functional landscape often depend on the landscape's authenticity as a food producer (Bills and Gross 2005). Researchers have generally concentrated on the proximity of peri-urban areas to large urban areas, and the presence of environmental features, such as water availability, attractive landscapes, accessibility and coastal landscapes to explain demand or land in rural areas around large urban centres. The factors of amenity and proximity become the expected features of whether an area is peri-urban or not. This process results in an increased demand for land and in land value exceeding its value for agriculture.

3. The Value of Peri-Urban Agriculture

Despite this emphasis on the consumption of peri-urban values, and the use of a 'global hinterland' for much urban food supply (Steel 2008), urban and peri-urban areas remain significant areas of food production. One third of all US farms, for example, are in peri-urban areas (Heimlich and Barbard 1997, cited in Audirac 1999). In many Asian cities, such as Hong Kong, Shanghai, Dakkar and Accra, over 45 % of urban demand for vegetables is met from production in urban and peri-urban areas (De Zeeuw and Dubbeling 2009). Australia is a significant agricultural producer, exporting around 60 % of the food it produces (PMSEIC 2010). The nation is generally

regarded as food secure (DAFF 2013), but this masks underlying vulnerabilities in food supply, reinforcing the importance of peri-urban regions. Houston (2005:210) argues that “conventional wisdom about agriculture in Australia’s peri-urban regions tends to be dismissive about its economic significance”. He estimates that Australia’s peri-urban regions comprise less than 3 % of the land used for agriculture, but are responsible for almost 25 % of the gross value of agricultural production in the five mainland states, a figure which “consistently and substantially understates the value of agricultural production in peri-urban regions” by adopting a statistical threshold which ignores smaller and intensive industries situated close to major population centres (Houston 2005:217).

Using Houston’s defining peri-urban characteristics, the Victorian Department of Sustainability and Environment states that “Victoria’s peri-urban region accounts for around one quarter of the State’s land area but half of the agricultural production value” (Department of Sustainability and Environment 2006:16). The displacement of agriculture from peri-urban land is a global phenomenon, removing agriculture from large areas in countries experiencing extensive urbanisation or population increases, such as China, India and the United States of America(US). There is a long history to claims that such displacement is not problematic (Versterby and Krupa1993). Using the US as an example, Fischel (1985) claimed that the loss of farmland nationally in the US was small and the impacts on production minor, and that the loss of farmland could be offset elsewhere by new methods of production. However, between 1949 and 1997, the US lost 20 % of its agricultural land. Nelson (1990) estimated that one fifth of prime agricultural land in the US was located within 50 miles of the 100 largest urban areas, and showed that between 1982 and 1992 nearly 10 million acres of cropland were lost in the US and total sales of farm produce fell by over \$42 billion. In peri-urban areas, sales of farm produce fell by \$19 billion. Nelson (1990) claimed that most of this reduced production was due to losses of cropland, and estimated that each new household on former farmland cost the nation’s agricultural economy \$100,000 in lifetime sales. The 12 million new households expected to be added to peri-urban areas between 1990 and 2040 may reduce national sales of farm produce by up to \$100 billion annually. Exurbanisation threatens much of the cropland located within about 100 miles of US cities. As Nelson (1999:147, 137) points out, “it is not difficult to see that if recent trends continue, much of exurbia’s cropland will be taken out of inventory within the next generation...at a cost to the American economy of perhaps trillions of dollars in farm sales...[and]...much of the contiguous 48 states may no longer be distinguishable as either urban or rural, being instead characterized mostly as low density, exurban development”. Goodenough (1978) argued that in many regions, the rate of farmland conversion would mean an end to most agriculture within a generation. Others have reinforced these conclusions.

Halsey (1999) pointed out that the greatest conversion of prime farmland to urban use had occurred in 20 major land resource areas representing 7 % of the total US land base including some of the most productive land in the US, such as the Sacramento and San Joaquin Valleys in California.

4. Land Use Planning and Agriculture

Land use planning is a powerful independent factor affecting the ways peri-urban areas function and is critical to maintaining a wide range of peri-urban values. Conversion of farming areas to non-farm uses is often regarded as undesirable due to the loss of a land resource, the dilution of farming systems, and consequent urban inefficiencies created by sprawled housing (Alterman1997). Under this approach, regulation to prevent land fragmentation is an indispensable tool to control property speculation and maintain effective rates of return on agricultural production against the allure of profits from anti-competitive land development. Effective land use planning is a necessary, though often not a sufficient, tool for the maintenance of landscapes and other environmental features, as well as productive activities, employment and agricultural land markets. Contrary perspectives suggest that as farming retreats, new urban employment opportunities emerge and local markets expand for farm produce (Bryant et al. 1982). These perspectives argue that alternative land uses are desirable, or inevitable, regardless of planning preferences (Bryant et al. 1982; Wills 1992; Bowie 1993; Barr 2003). Advocates of market oriented policy criticize the legitimacy of policies aimed at supporting non-productive activities within multi-functional landscapes, such as environmental works, as providing trade and markets distortions (Potter and Burney 2002).

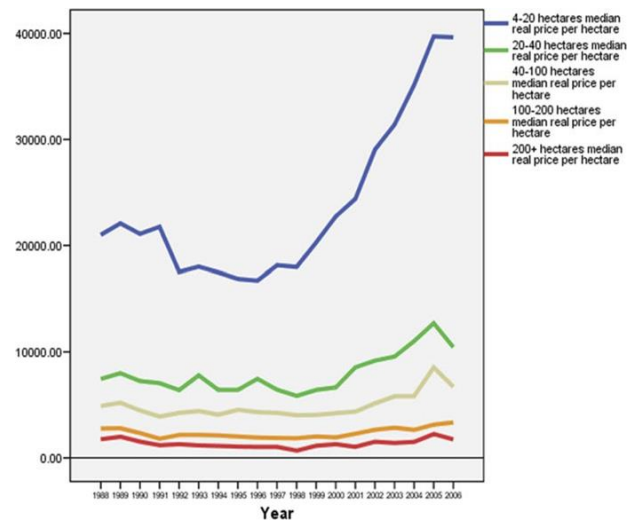


Fig. 2. Median price/ha by property size (Victoria \$2006) (Source: Barr and McKenzie 2007)

Despite difficulties in its application, agricultural protection zoning is a well-established technique in developed countries to

designate agricultural uses, retain larger lot sizes and restrict urban related and other incompatible uses of land by statute (Sinclair et al. 2003; American Farmland Trust 2002). Such zoning can also seek to achieve a range of environmental and social outcomes such as the retention of rural landscapes, biodiversity values, and limitations on high infrastructure costs to small rural lots. Larger lot sizes and use controls also maintain future options, flexibility and the potential for variation and innovation denied by close subdivision.

These issues have been studied in detail only sporadically in Australia. Most Australian state governments have been reluctant over long time frames to protect peri-urban agriculture from a range of development pressures. Peri-urban rural subdivision controls are common but extensive urban expansion, rural residential sub-division and commercial uses continue to affect peri-urban areas and drive up the price of agricultural value. The little ex-urban regional planning which has occurred in Australia has now been generally discarded. Rural land uses usually are determined more by factors such as the structure of the economy, patterns of social change and politics and planning than regulation or the needs of agricultural production. This has produced a focus on a political struggle around rural property rights.

5. Peri-Urban Land Use Planning in Melbourne

Despite periodic attempts to provide certainty through long term policy, land use planning for the Melbourne peri-urban area has been subjected to bewildering change. In 1971, the former Melbourne metropolitan planning authority, the Melbourne and Metropolitan Board of Works (MMBW), attempted to integrate the planning of the Melbourne metropolitan area with the city's hinterland. The green belt (incorporating green wedges between growth corridors) comprised 2400 km² or about half the total planning area. The MMBW used two methods to reduce both land speculation and pressures for development in the non-urban areas. The first was to reserve sufficient quantities of urban land, and the second was to protect non-urban areas from development through the use of permanent regulatory zones. These zones sought long term certainty for all affected parties through the use of high minimum sub-division sizes up to 80 ha, strong land use controls, the preservation of large metropolitan farms and the introduction of more restrictive uses in environmental zones. In the mid-1970s, the MMBW commissioned two major studies into issues affecting the non-urban zones, the Review of Planning Policies for the Non-Urban Zones (MMBW 1977), and the Metropolitan Farming Study (Aberdeen Hogg and Associates 1977). Both studies made strong recommendations aimed at ensuring the continuation of farming in the non-urban zones. The farming study argued that:

The government in 1971 also established regional planning authorities to develop cross-sectoral planning for the environmentally significant inner peri-urban areas of the Dandenong Ranges, Upper Yarra Valley and the Mornington

Peninsula. The resultant policies, plans and statutory measures were interventionist, seeking alter-native futures to path-dependent trajectories associated with trend analyses. They restrained urban development, controlled rural subdivision and prevented the introduction of urban related uses into rural areas in order to protect rural land uses, including agricultural practice, landscapes and environmental features. Land fragmentation and future development were identified as the main threats to maintain rural landscapes. The Upper Yarra Valley and Dandenong Ranges Authority, for example, severely limited future subdivision and dwelling development on the 62 % of 17,272 rural lots and the 42 % of 43,334 urban lots without dwellings (Loder and Bayly1980). This removal of development expectations controlled land speculation, protected environmental qualities and increased the capacity of agriculture to persist by maintaining comparative rates of return and the potential to innovate. This kind of regional planning is rare. The 2014 metropolitan plan, Plan Melbourne, proposes to investigate an agricultural food overlay to protect high value agricultural land, and to identify, protect and manage strategically significant agricultural land. However, such strategic statements about protecting the values of peri-urban land have been pre-empted by the 2013 planning system changes which make rural zones more permissive. Similarly, an undertaking to introduce a permanent metropolitan urban boundary has been made redundant by successive governments rezoning sufficient rural land on Melbourne's fringes to provide a 30 year supply of residential land at some of the world's lowest densities.

6. Case Study Region

This case study explores three rural scenarios for peri-urban land which test the extent to which rural land supply can meet projected rural dwelling demand, limit rural land development and transfer demand for land to urban and regional settlements. The case study focuses on seven peri-urban municipalities extending north-westerly from Melbourne. Melbourne is Australia's second largest city with a population of around 4.35 million. It is the fastest growing state capital in Australia, and its population is projected to overtake that of Sydney by 2053. Many of the areas of Melbourne experiencing the strongest growth are on the city's outer fringe (ABS 2014). The Melbourne peri-urban region can be defined structurally by its physical structure and form, or functionally, or by a combination of spatial and functional factors (Buxton et al. 2006). Structural characteristics include lower population and building densities compared to urban regions, the heterogeneous nature of land uses and rapid rates of change; while a functional analysis of social and economic processes is both interactionist and system based. The resilience of peri-urban systems therefore is determined by the system components and how they interact, that is by multiple physical and social states. Thus, the relationships between elements determine the system's function and its capacity to respond to

change. Melbourne’s peri-urban region consists of two non-urban belts of land round the city and their associated townships extending to about 160 km from the Melbourne central business district. The first, or inner belt, is the Melbourne green belt extending from the metropolitan urban growth boundary to the outer rural boundary of the 17 municipalities which form the green belt. The second, or outer belt, includes eight municipalities in a broader arc extending from the western to the eastern coast line. Beyond this belt, a number of large regional townships form the outer edge to this broad region. The case study area (Fig. 10.2) examined includes seven peri-urban municipalities. The area is bounded to the south by Melbourne’s urban-rural edge, to the west by the transport corridor to the city of Ballarat and to the north by the transport corridor to the city of Bendigo. The two largest regional settlements are Ballarat with a population of 95,582 and Bendigo with a population of 86,078. The seven municipalities are Moorabool, Macedon Ranges, Ballarat, Hepburn, Mount Alexander, Central Goldfields and Greater Bendigo, with a total population of 308,558. The study area also includes a number of medium sized towns, such as Bacchus Marsh, and small towns. It contains many historic features and is predominantly rural in appearance with 23 % of the land area zoned for public use, with the remaining rural land zoned for rural production, rural conservation or rural living uses. The region is notable for its landscape quality, biological diversity, rural production and tourism.

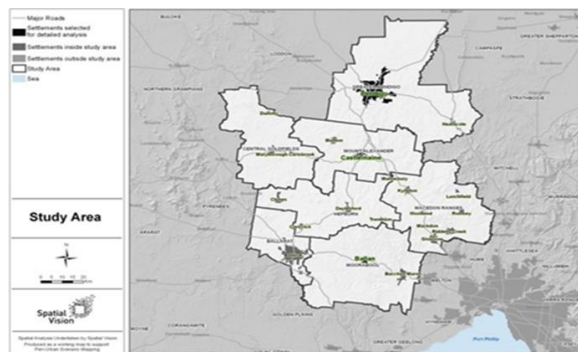


Fig. 3. Case study region

7. Case Study Methodology

This case study (Buxton et al. 2014) aims to help redress the lack of interest in regional planning and in the integration of metropolitan, rural and township land uses by investigating:

- Methods for limiting future development in rural areas through controls on small rural lot development and on rural land subdivision, and
- Means for transferring development from rural to township areas.

It is a supply-led approach, which assumes that the existence of lot types such as rural-residential lots will create a demand for dwellings on those lots, and that vary-ing the types of land supply in townships will alter consumer preferences. This

approach assumes that land supply influences demand, specifically, that the existence of small rural lots will result in their use for dwellings and that alternative housing type and lots within townships will in turn influence demand in different ways. The study estimates current and potential land supply, and its adequacy to meet dwelling demand for both rural and urban areas through to 2040. Three rural scenarios test the extent to which rural land supply can meet projected rural dwelling demand. The first is a Business-as-usual (BAU) scenario under which supply is determined by the number of existing and potential new lots under existing planning schemes. The second, the Rural Preservation (RP) scenario, discourages rural development by requiring high minimum lot sizes of 16-40 ha in three rural zones for the construction of one dwelling. This scenario also encourages township development in three future urban zones on township fringes by reducing the minimum lot sizes for dwellings there. The third scenario, Tenement Control (TC), requires the area of multiple lots in the same ownership in rural zones to total 25 ha (TC25) or 40 ha

(TC40) for the construction of one dwelling. The latter two scenarios assume an alternative future to be achieved by 2040, defined as a continuation of 2014 existing physical conditions, and are used to limit dwelling growth on rural land.

8. Findings

The application of the Rural Preservation and Tenement Control scenarios substantially reduces the potential for dwelling construction in the three rural zones studied by reducing rural development on existing land parcels and restricting rural land subdivision. However, the scenarios increase the development potential in the three urban edge zones by transferring forgone rural demand from rural to urban edge zones and increasing development yields in the urban edge zones. The application of the three scenarios led to the following findings.

9. Conclusion

Cities which protect their hinterlands are likely to be the most economically prosperous this century. The maintenance of physical attractiveness and natural resources will prove to be essential to continued economic innovation, and will make significant contributions to wealth, health, personal identity and social harmony in both city and region. The retention of peri-urban agricultural areas will also contribute to the development of more resilient urban food systems. The level of successful interaction of these factors will define a liveable and functioning community. Yet governments routinely separate economic, social and environment sectors and fail to use tools within the land use planning system to achieve integration. Governments also separate rural areas from towns, and urban hinterlands from metropolitan areas. Such spatial separation leads to sectoral policies which are as fragmented as the pattern of land ownership. Climate change, environmental degradation, regional population increases and a range of global, national

and regional factors are expected to increase pressures on regional resources. Climate change is likely to reduce the resilience of human and natural systems leading to tolerance thresholds being exceeded and vulnerability increased. It is likely to particularly impact the natural systems that underpin food production. The result could be a greatly increased risk of non-linear change over a short period that is both catastrophic and irreversible. However, institutional and policy fragmentation is hampering the ability of governments at all levels to develop anticipatory policies which can assist the peri-urban region to adapt to rapid and fundamental change. In times of rapid change with unpredictable outcomes, the resources of peri-urban areas may increase in importance. It would seem prudent to maintain the values of peri-urban areas, at least in the

short term, during times of increasing change and threat. Integrated regional planning is essential if reciprocal impacts of sectors are to be considered and such planning requires a strong role for governments. A range of subdivision practices based around commercial or residential uses is increasingly being employed in Australian peri-urban areas. However, a return to regulatory practice will need to consider read option of planning techniques formerly used, included tenement controls, rural lot restructuring and strong subdivision and use controls.

References

- [1] The Role of Peri-Urban Land Use Planning in Resilient Urban Agriculture
- [2] Land use planning for peri-phari